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10/573,687	03/27/2006	Isamu Yoshii	L9289.06136	7154

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Dickinson Wright PLLC
James E. Ledbetter, Esq.
International Square
1875 Eye Street, N.W., Suite 1200
Washington, DC 20006

EXAMINER	
HUYNH, KHOA B	

ART UNIT	PAPER NUMBER
4145	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/573,687	YOSHII ET AL.	
	Examiner	Art Unit	
	KHOA B. HUYNH	4145	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _27 March 2006_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-7_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-7_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _03/27/06_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. **Claim 7** is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Based on Supreme Court precedent (*Diamond v. Diehr, 450 U.S. 175, 184 (1981); Parker v. Flook, 437 U.S. 584 n.9 (1978); Gottschalk v. Benson, 409 U.S. 63, 70 (1972); Cochrane v. Deener, 94 U.S. 780, 787-88 (1876)*) and recent Federal Circuit decisions, a § 101 process must be tied to another statutory class or transform underlying subject matter to a different state or thing. Neither of these requirements are met by claim 7.

3. **Claim 7** recites multiple steps: determining, detecting, generating, and combining. There is no apparatus positively recited to accomplish these steps. The transformation requirement is a physical transformation. Data transformation is not considered. Claim 7 clearly don't have a physical transformation.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-5, 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kim, US 2003/0086507** in view of **White, US 2002/0127986**.

6. **As per claim 1,**

7. Kim teaches: a transmission apparatus that transmits a frequency division multiplexed transmission signal (***Kim, fig 1*** *shows such transmission apparatus, multiple carriers indicate frequency division*) based on reception quality information indicating reception quality of a communicating party (***Kim, page 1, paragraph 11, lines 17-22***, *"Consequently, this known hardlimiting technique fails to adequately address the problems of the reducing the PAR of an input signal while also preserving the signal integrity within the error vector measurements of the applicable wireless standard (e.g., CDMA or UMTS) for the receiver of the transmitted signal."; Kim teaches here that a known technique in the art fails to meet up to the receiver's quality standard, and that his invention can;* ***Kim, page 4, paragraph 40, lines 10-12***, *"By this configuration, clipping filter system 200 may have the same spectral quality as the initial signal, thereby avoiding leakage and out-of-band spectral artifacts."*) the transmission apparatus comprising:

8. … a detection section that detects a peak of a transmission signal (***Kim, fig 2, element 110***: *peak search detector*)

9. a generation section that generates a waveform with an inverse characteristic of a waveform of the peak (***Kim, fig 2, element 125***: *clipping filter;* ***Kim, page 2, paragraph 29, lines 3-7***, *"This clipping factor calculated complex number(s) is then fed into a clipping filter 125, which generates a threshold-correcting signal that insures the signal output from peak limiting architecture 100 is without significant out-of-band emissions";* ***Kim, page 4, paragraph 48, lines 7-9***, *"Consequently, the threshold-correcting signal may be viewed as having inverse characteristics to the found highest peak."*)

10. a combination section (***Kim, fig 2, element 140***: *summing device*) that combines the waveform of the transmission signal and the waveform with the inverse characteristic (***Kim, fig 4, element 35***: *adding the threshold correcting signal to the window of samples at the position of the highest peak*) at a frequency corresponding to a modulation and coding scheme parameter of a lowest transmission efficiency among modulation and coding scheme parameters determined for respective frequencies ***(Kim, page 3, paragraph 34, lines 2-4***, *"The highest peak is located by peak search detector 110 by monitoring if* $|Y(n)|^2 > \lambda$*"; Y(n) is the composite signal,* λ *is a PAR threshold; waveform is combined at the highest peak; lowest transmission efficiency occurs where a PAR of a signal exceeds the PAR threshold the most, same as the highest peak*)

11. and a transmission section that transmits the transmission signal combined with the waveform with the inverse characteristic (***Kim, fig 1, element 70***: *amp,* ***element 80***: *antenna;* ***Kim, page 2, paragraph 21, lines 15-21***, *"The resultant output of peak limiting device 60 may be thereafter signal processed by a signal processor 65, and*

then converted from digital samples to an analog signal through a D/A converter 70. The analog signal generated by D/A converter 70 is then fed to at least one power amplifier 75 for transmission through at least one antenna 80.")

12. Kim doesn't teach: a determining section that determines a modulation and coding scheme parameter per frequency

13. White teaches: a determining section (***White, page 2, paragraph 20, lines 13-16***, *"the processing unit may also identify the type of modulation format of a signal based on its bandwidth and signal statistics"*) that determines a modulation and coding scheme parameter per frequency (***White, fig 5, element 510:*** *for each carrier determine modulation format*)

14. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use White's method of determining modulation format for each carrier in Kim's system since "RF signals can be modulated according to any number of modulation formats which are well known in the art, including, for example, TDMA, GSM, CDMA, WCDMA, QAM, and OFDM, each of which have varying bandwidths" (***White, page 1, paragraph 8, lines 1-5***). This method of improving Kim's system was within the ordinary ability of one of ordinary skill in the art based on the teaching of White. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and White to obtain the invention.

15. **As per claim 2**,

16. Kim and White teach: the transmission apparatus according to claim 1 (see claim 1 rejection) further comprising

17. Kim further teaches: a selection section that selects frequencies in ascending order of transmission efficiency of the modulation and coding scheme parameters every time the peak is detected *(**Kim, page 3, paragraph 36, lines 5-12**, "Consequently, the highest local extrema (e.g., highest peak) positioned within a relatively small window length is compensated for selected by peak compensating device 105. It should be noted that any remaining extrema (e.g., peaks) in the samples after compensating for the highest peak might be addressed by undergoing at least one more iteration through peak compensating device 105."; ascending order of transmission efficiency means from highest peak to lowest peak)*

18. wherein the combination section combines the waveform of the transmission signal and the waveform with the inverse characteristic at selected frequencies ***(Kim, page 3, paragraph 31, lines 1-7**, "To insure that the threshold-correcting signal is added at the appropriate location of the peak sample within the window, peak compensating device 105 may also comprise an adjustable delay 130. Adjustable delay 130 delays the threshold-correcting signal with respect to summing device 140. This adjustable delay functionally corresponds with the location of the detected peak within the window.")*

19. **As per claim 3**,

20. Kim and White teach: The transmission apparatus according to claim 1 (see claim 1 rejection)

21. Kim further teaches: wherein the detection section detects the peak in the transmission signal combined with the waveform with the inverse characteristic (***Kim, fig 4, element 30****: examining the effects of the threshold correcting signal on any other found peaks and/or the set of samples;* ***Kim, page 3, paragraph 38, lines 6-15****, "It should be noted that several iterations of the peak location and peak clipping may be performed by peak limiting architecture 100, depending on the requirements for resulting PAR and the degree of clipping noise that may be tolerated. It should be noted that the window size might be reduced to minimize the complexity in implementation. Nonetheless, softlimiting the peaks may reduce or create secondary peaks in the signal, which maybe refined through the iterative approach"*)

22. further comprising a selection section that, when no peak is detected in the transmission signal combined with the waveform with the inverse characteristic (***Kim, page 5, paragraph 52, lines 1-4****, "Once the highest peak within the first window is found and compensated for by generating the threshold-correcting signal"; compensated for means there is no more peak detected after combining*)

23. selects remaining frequencies after frequencies are removed from the frequencies in a communication band in descending order of transmission efficiency of corresponding modulation and coding scheme parameters (***Kim, page 3, paragraph 38, lines 1-6****, "The clipped composite signal may be thusly expressed as: Y'(n)=Y(n)-γY(k)W(n-k), n=k-L, . . . , k-1, k, k+1, . . . k+L where W(n), n=-L, -L+1, . . . L-1, L, are the*

*clipping filter coefficients of length 2*L+1, corresponding with the filter shape generated for peak suppression. This procedure is repeated for every new peak that is found"*; ***Kim, page 5, paragraph 52, lines 7-13***, *"once the first set of samples has been, for example, searched window by window for the highest peak of the samples, and a threshold correcting signal generating for each corresponding window, another set of sample are received (40), and the process continues, window by window, until all of the samples of this next set have undergone the steps detailed hereinabove"; in descending order of transmission efficiency means from lowest peak to highest peak; after the highest peak in a window is compensated from, all the lower peaks are removed from consideration, moved to next window*)

24. and wherein the combination section (***Kim, fig 2, element 140***: *summing device*) combines the waveform of the transmission signal and the waveform with the inverse characteristic at the remaining frequencies (***Kim, fig 4, element 35***: *adding the threshold correcting signal to the window of samples at the position of the highest peak*)

25. **As per claim 4.**

26. Kim and White teach: the transmission apparatus according to claim 3 (see claim 3 rejection)

27. Kim further teaches: wherein the selection section repeats the processing of removing frequencies from the frequencies in the communication band in descending order of transmission efficiency of corresponding modulation and coding scheme parameters (***Kim, page 3, paragraph 38, lines 1-6***, *"The clipped composite signal may*

*be thusly expressed as: Y'(n)=Y(n)-γY(k)W(n-k), n=k-L, . . . , k-1, k, k+1, . . . k+L where W(n), n=-L, -L+1, . . . L-1, L, are the clipping filter coefficients of length 2*L+1, corresponding with the filter shape generated for peak suppression. This procedure is repeated for every new peak that is found"*; ***Kim, page 5, paragraph 52, lines 7-13***, *"once the first set of samples has been, for example, searched window by window for the highest peak of the samples, and a threshold correcting signal generating for each corresponding window, another set of sample are received (40), and the process continues, window by window, until all of the samples of this next set have undergone the steps detailed hereinabove"; in descending order of transmission efficiency means from lowest peak to highest peak; after the highest peak in a window is compensated from, all the lower peaks are removed from consideration, moved to next window*) a predetermined number of times at a maximum (***Kim, page 4, paragraph 47, lines 8-17***, *"For example, the first set may comprise 1,000 samples, while each window may comprise eight (8) samples. It should be noted that each window of samples might have no peaks, or alternatively, have more than one peak. As such, this searching step contemplates and compares each sample having a peak within that window to ascertain the highest peak. As will be detailed hereinbelow, each of the first set of samples is examined using these window creating and peak searching process steps."; since there is 8 samples per window, the maximum 7 which is 8 minus the highest peak*)

28. As per claim 5.

29. Kim and White teach: the transmission apparatus according to claim 1 (see claim 1 rejection)

30. Kim further teaches: wherein the combination section (***Kim, fig 2, element 140**: summing device*) combines the waveform of the transmission signal and the waveform with the inverse characteristic (***Kim, fig 4, element 35**: adding the threshold correcting signal to the window of samples at the position of the highest peak*) at a frequency corresponding to a modulation and coding scheme parameter of a lowest transmission efficiency among modulation and coding scheme parameters determined for respective frequencies ***(Kim, page 3, paragraph 34, lines 2-4**, "The highest peak is located by peak search detector 110 by monitoring if $|Y(n)|^2 > \lambda$"; $Y(n)$ is the composite signal, λ is a PAR threshold; waveform is combined at the highest peak; lowest transmission efficiency occurs where a PAR of a signal exceeds the PAR threshold the most, same as the highest peak*) on a frequency axis (***Kim, page 2, paragraph 21, lines 11-13**, "peak limiting device 60 reduces the PAR of an input signal using a spectrally matched softclipping technique"; spectrally matched softclipping is done in the frequency domain/axis*)

31. **As per claim 7**,

32. Kim teaches: A peak suppression method for suppressing a peak in a frequency division multiplexed transmission signal (*Kim, page 2, paragraph 21, lines 7-15, "This composite signal is then processed by a peak limiting device 60, in accordance with the present invention. Peak limiting device 60 compensates for at least the highest peak*

above a designated or predetermined threshold found within a window of samples. In so doing, peak limiting device 60 reduces the PAR of an input signal using a spectrally matched softclipping technique, for example, thereby minimizing out-of-band emissions without a drop-off in the efficiency of at least one power amplifier 75") based on reception quality information indicating reception quality of a communicating party (***Kim, page 1, paragraph 11, lines 17-22***, *"Consequently, this known hardlimiting technique fails to adequately address the problems of the reducing the PAR of an input signal while also preserving the signal integrity within the error vector measurements of the applicable wireless standard (e.g., CDMA or UMTS) for the receiver of the transmitted signal."; Kim teaches here that a known technique in the art fails to meet up to the receiver's quality standard, and that his invention can;* ***Kim, page 4, paragraph 40, lines 10-12***, *"By this configuration, clipping filter system 200 may have the same spectral quality as the initial signal, thereby avoiding leakage and out-of-band spectral artifacts."*) the method comprising the steps of:

33. detecting a peak of a transmission signal (***Kim, fig 2, element 110***: *peak search detector*)

34. generating a wave form with an inverse characteristic of a waveform of the peak (***Kim, fig 2, element 125***: *clipping filter;* ***Kim, page 2, paragraph 29, lines 3-7***, *"This clipping factor calculated complex number(s) is then fed into a clipping filter 125, which generates a threshold-correcting signal that insures the signal output from peak limiting architecture 100 is without significant out-of-band emissions";* ***Kim, page 4, paragraph***

48, lines 7-9, *"Consequently, the threshold-correcting signal may be viewed as having inverse characteristics to the found highest peak."*)

35. and combining the waveform of the transmission signal and the waveform with the inverse characteristic (***Kim, fig 2, element 140***: *summing device;* ***Kim, fig 4, element 35***: *adding the threshold correcting signal to the window of samples at the position of the highest peak*) at a frequency corresponding to the modulation and coding scheme parameter of a lowest transmission efficiency among the modulation and coding scheme parameters determined for respective frequencies ***(Kim, page 3, paragraph 34, lines 2-4***, *"The highest peak is located by peak search detector 110 by monitoring if* $|Y(n)|^2 > \lambda$*"; Y(n) is the composite signal, λ is a PAR threshold; waveform is combined at the highest peak; lowest transmission efficiency occurs where a PAR of a signal exceeds the PAR threshold the most, same as the highest peak*)

36. Kim doesn't teach: determining a modulation and coding scheme parameter per frequency

37. White teaches: determining a modulation and coding scheme parameter per frequency (***White, fig 5, element 510:*** *for each carrier determine modulation format*)

38. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use White's method of determining modulation format for each carrier in Kim's method since "RF signals can be modulated according to any number of modulation formats which are well known in the art, including, for example, TDMA, GSM, CDMA, WCDMA, QAM, and OFDM, each of which have varying bandwidths" (***White, page 1, paragraph 8, lines 1-5***). This method of improving Kim's method was

within the ordinary ability of one of ordinary skill in the art based on the teaching of White. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and White to obtain the invention.

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39. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Kim, US 2003/0086507** in view of **White, US 2002/0127986** further in view of **Chen, US 2004/0165524**.

40. **As per claim 6**,

41. Kim and White teaches: the transmission apparatus according to claim 1 (see claim 1 rejection) further comprising

42. … wherein the combination section (***Kim, fig 2, element 140**: summing device*) combines the transmission signal … and the waveform with the inverse characteristic (***Kim, fig 4, element 35**: adding the threshold correcting signal to the window of samples at the position of the highest peak*)

43. Kim and White doesn't teach: an inverse orthogonal transform section that performs an inverse orthogonal transform on the transmission signal

44. Chen teaches: an inverse orthogonal transform section that performs an inverse orthogonal transform on the transmission signal (***Chen, fig 1**, transmission signal is transformed by element 116: Inverse Fast Fourier Transform*)

45. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Chen's technique of inverse orthogonal transform transmission signal Kim's system since "the IFFT circuit may operate to sample the OFDM signal of equation (1) at time intervals of .DELTA.t=T/JN, where J is the over-sampling factor. To reduce peak power regrowth and distortion, the time domain signal may be over-sampled by a factor greater than two. An over-sampled signal can be obtained by padding [C.sub.k].sub.k=0.sup.N-1 with (J-1)*N zeros and taking the inverse discrete Fourier transform (IDFT), or the inverse fast Fourier transform (IFFT)" (***Chen, page 4, paragraph 41, lines 4-11***). This method of improving Kim's system was within the ordinary ability of one of ordinary skill in the art based on the teaching of White. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, White, and Chen to obtain the invention.

Conclusion

46. The prior arts made of record and not relied upon are considered pertinent to applicant's disclosure.

a. Morris, US 2004/0203430: Peak window clipping and filtering
b. Hunton, US 6,449,302: Peak suppression
c. Mayor, US 6,700,388: Sub-band peak detection
d. Robinson, US 2005/0017800: Spectral bands peak reduction
e. Copeland, US 2004/0052314: Peak detection and cancellation
f. Hahm, US 6,356,606: Peak limiting
g. Yoon, US 7,359,682: Peak reduced signal
h. Itahara, US 6,982,965: Peak suppression

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHOA B. HUYNH whose telephone number is (571) 270-7185. The examiner can normally be reached on Monday - Thursday: 7:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pankaj Kumar can be reached on (571) 272-3011. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./
Examiner, Art Unit 4145
/Pankaj Kumar/
Supervisory Patent Examiner, Art Unit 4145